II. Soluiion by J. SCHEFFER, A. M., Hagerstown, Md.; M. A. GRUBER, A. M., War Department, Washington, D. C.; J. H. DRUMMOND, LL. D., Portland, Me.; ELMER SCHUYLER, B. Sc., Boys' High School, Reading, Pa.; COOPER D. SCHMITT, M. A., University of Tennessee, Knoxville, Tenn.; and H. S. VANDIVER, Bala, Pa.

Putting $xyzw=P$, the given equations change into the following:

$$P/z+P/y+P/x=a,\ P/z+P/y+P/w=b,$$

$$P/z+P/x+P/w=c,\ P/y+P/x+P/w=d.$$

Adding, we get $P/x+P/y+P/z+P/w=\frac{a+b+c+d}{3}$.

Putting $\frac{a+b+c+d}{3}=s$, and subtracting each of the above equations, gives

$$P/w=s-a,\ P/x=s-b,\ P/y=s-c,\ P/z=s-d.$$

Multiplying, $P^3=(s-a)(s-b)(s-c)(s-d)$.

$$\therefore x=\sqrt[3]{\frac{(s-a)(s-c)(s-d)}{(s-b)^2}},\ y=\sqrt[3]{\frac{(s-a)(s-b)(s-d)}{(s-c)^2}},$$

$$z=\sqrt[3]{\frac{(s-a)(s-b)(s-c)}{(s-d)^2}},\ w=\sqrt[3]{\frac{(s-b)(s-c)(s-d)}{s-a)^2}}.$$

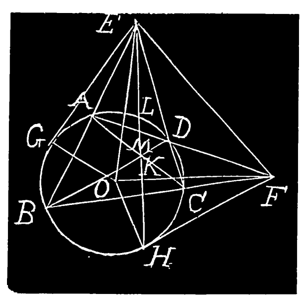
GEOMETRY.

146. Proposed by H. R. HIGLEY, M. Sc., Professor of Mathematics, Normal School, East Stroudsburg, Pa.

If the opposite sides of a quadrilateral inscribed in a circle be produced to meet, the square on the line joining the points of concurrence=the sum of the squares on the two tangents from these points. Ex. 24, page 219, Mackay's *Elements of Euclid.*

Solution by G. B. M. ZERR, A. M., Ph. D., The Temple College, Philadelphia, Pa., and J. SCHEFFER, A. M., Hagerstown, Md.

Let $ABCD$ be the inscribed quadrilateral; E, F the intersection of the opposite sides produced; O the center of the circle; M the intersection of the diagonals; EG tangent from E; FH, FL tangents from F.



Draw EF, EM and let EM cut FO in K. It has been shown that EM is the polar of F.

$\therefore EM$ passes through L, H and is perpendicular to OF.

$\therefore EF^2=FK^2+FK^2$.

But $EK^2=EO^2-OK^2$, $FK^2=(FO-OK)^2$.

$\therefore FK^2=FO^2-2FO,OK+OK^2$.

But $2FO.OK=2OH^2=2r^2$. $\therefore EK^2+FK^2=EO^2+FO^2-2r^2$.

$EG^2=EO^2-r^2$, $FH^2=FO^2-r^2$.

$\therefore EG^2+FH^2=EO^2+FO^2-2r^2=EK^2+FK^2=EF^2$.